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Matched-field processing (MFP) must frequently be employed under conditions of significant environmental and array element location mismatch. This necessitates the development of techniques that stabilize MFP with respect to mismatch errors for successful matched-field localization of submerged sources. A technique that offers this kind of stability (as well as some noise rejection) is incoherent frequency averaging [A. Baggeroer, W. Kuperman, and H. Schmidt, J. Acoust. Soc. Am. 83, 571-587 (1988)]. This technique incoherently averages a number of single-frequency matched-field ambiguity surfaces together to simulate broadband averaging. Its ability to suppress signal and noise sidelobes has already been demonstrated [G. B. Smith, D. R. DelBalzo, and C. Feuillade, J. Acoust. Soc. Am. Suppl. 1 83, S101 (1988)]. In this paper, the ability of incoherent frequency averaging to suppress false peaks caused by destabilization due to mismatch errors is investigated. In this preliminary study, mismatch errors are modeled as random perturbations of the phases of the complex pressures. It is demonstrated that this technique does offer significant stabilization with respect to these random phase errors. The relationship between the number of surfaces needed in the average and the amount of random phase error introduced will be investigated.

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